

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT ENGINEERING AND COMPLIANCE DIVISION <i>Large Coating, Printing and Chemical Operations Team</i> APPLICATION PROCESSING AND CALCULATIONS	PAGE 1 of 9 APP. NUMBERS 497492, 512705, 512708 PROCESSED BY SMP REVIEWED BY DATE 08/07/10
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**PERMIT TO CONSTRUCT/OPERATE EVALUATION
(LASER CUTTER AND DUST COLLECTOR)**

Applicant's Name	HONEYWELL INTERNATIONAL
Company I.D.	800003
Mailing Address	2525 W. 190 TH STREET, TORRANCE, CA 90504
Equipment Address	SAME AS ABOVE

EQUIPMENT DESCRIPTION

APPLICATION NO. 497492 (Constructed without P/C) (P/O) [D230]

LASER CUTTING SYSTEM CONSISTING OF:

1. LASER CUTTER, ROFIN-SINAR, MODEL NO. RS 1200 SM, 2' – 8" W. X 6' – 6" L. X 4' – 7" H., ELECTRICALLY POWERED, 1200W,
2. A LASER CUTTING TABLE, 6' - 3" W. X 18' - 10" L.
3. A CHILLER, 2' – 8" W. X 5' – 3" L. X 4' – 4" H.
4. A PERMENANT TOTAL ENCLOSURE, 26' – 9" L. X 15' – 3" W. X 12' – 0" H., FOR THE LASER CUTTER AND THE LASER CUTTING TABLE.

APPLICATION NO. 512708 (New Construction, (P/C - P/O) [C231]

AIR POLLUTION CONTROL SYSTEM CONSISTING OF:

1. DUST COLLECTOR, TORIT, MODEL NO. DFO 4-48, 7' - 1" W. X 10' - 5" D. X 13' - 10" H., WITH 48 CARTRIDGE FILTERS, MODEL TORIT ULTRA-WEB, EACH 1' - 2" DIA. X 2' - 2" L., 9120 SQ. FT. TOTAL FILTER AREA, AND PULSE JET CLEANED.
2. EXHAUST SYSTEM WITH A 40 H.P. BLOWER VENTING A LASER CUTTING SYSTEM.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT ENGINEERING AND COMPLIANCE DIVISION <i>Large Coating, Printing and Chemical Operations Team</i> APPLICATION PROCESSING AND CALCULATIONS	PAGE 2 of 9 APP. NUMBERS 497492, 512705, 512708 PROCESSED BY SMP REVIEWED BY DATE 08/07/10
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------

APPLICATION NO. 512705

Title V/RECLAIM REVISION

HISTORY

The above class III application (# 497492) was filed with the District for permit to operate an existing laser cutting system, which was operating without a permit. The applicant subsequently submitted an application (# 512708) to construct and operate a cartridge dust collection system, which will vent the above described laser cutter.

Honeywell International fabricates aerospace components (stainless steel, aluminum, nickel and titanium). It has a number of active permits from AQMD to operate plasma arc cutters, spray booths, coating dip-tanks, surface preparation lines, jet engine test cells, dust collectors, I.C. Engines, scrubbers, ovens, heaters, boilers, afterburners, etc. under a RECLAIM/Title V permit (I.D. # 800003).

The laser cutter cuts various metal sheet parts, including stainless steel and inconel alloys, with different percentages of chromium and nickel contents. The laser cutting system is located in a permanent total enclosure. With the usage of high efficiency cartridge filters to control the particulate emissions, this project will have negligible particulate emissions. Thus, no PM10 offsets will be required for this project and BACT requirements will not be triggered.

The District database shows that the applicant has received one odor nuisance complaint from the public in the last two years. The facility was operating in compliance during the complaint inspection. The applicant did not receive any notice of violation or notice to comply in the last two years.

This facility is located in an industrial area and no schools are located within 1000 feet from the property-line. Also, there will be negligible (<0.5 lb/day) PM10 emission increases with less than 1 in a million cancer risk from this project. Thus, Rule 212 public notice is not required for this project.

A Title V renewal permit for this facility was issued on March 25, 2010. The proposed project is considered as a “de minimis significant permit revision” to the renewed Title V permit, as described in the Regulation XXX evaluation. This is the first revision since the TV permit renewal was issued.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT ENGINEERING AND COMPLIANCE DIVISION <i>Large Coating, Printing and Chemical Operations Team</i> APPLICATION PROCESSING AND CALCULATIONS	PAGE 3 of 9 APP. NUMBERS 497492, 512705, 512708 PROCESSED BY SMP REVIEWED BY DATE 08/07/10
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------

PROCESS DESCRIPTION

Honeywell is a large sized metal component manufacturing company. During the fabrication, this company uses laser cutters for sheet metal cutting. On the laser cutting system, a laser beam moves along a programmed path on the flat metal sheet to obtain the desired cut or shape. In brief, the energy from the laser beam melts the metal at a high temperature. This operation generates particulate emissions.

During the laser cutting operation a stationary laser resonator is directed to a moving lens by two mirrors mounted on a moving gentry. The beam is concentrated on the work-piece by the lens. The work-piece remains stationary while the narrow strip metal, approximately 0.014" width (maximum), is removed along the cut path made by the concentrated laser beam. The metal is melted by the energy of the beam. The molten metal is removed with the aid of assist gas. The assist gas flows through the nozzle in the cutting head. Carbon dioxide mixture is used in the above laser cutting system.

The laser beam is capable of cutting any metal up to 0.25" thick. However, the most common thickness is around 0.1". The applicant informed the District that the maximum thickness of the sheet metal currently processed is only 0.15" thick. The power supply provides a variable current output, which allows the operator wide variations in cutting speeds. Contouring accuracy is a function of the feed rate and the curvature of the path. The mirrors and lens are positioned to produce the programmed work piece geometry. The program specifies feed rate, laser power, assist gas and coolant.

I visited the Honeywell facility on August 9, 2010 and observed the equipment in operation. The laser cutter was located in an enclosure. The sheet metal was fixed on a jig and the laser performed cutting operation. I did not observe any visible smoke at the cutting area. Most of the hot metal sparks (more than 50%) were hitting below the part and metal particulates got deposited within the jig cavities. Subsequently I observed a considerable amount of metal depositions on the jig. Please see the pictures in the folder.

OPERATING HOURS

Average: 24 hr/day, 7day/week, 52 weeks/year

Maximum: 24 hr/day, 7 day/week, 52weeks/year

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT ENGINEERING AND COMPLIANCE DIVISION <i>Large Coating, Printing and Chemical Operations Team</i> APPLICATION PROCESSING AND CALCULATIONS	PAGE 4 of 9 APP. NUMBERS 497492, 512705, 512708 PROCESSED BY SMP REVIEWED BY DATE 08/07/10
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------

EMISSION CALCULATIONS

Application No. 497492 (Laser Cutter)

Particulate emissions are expected from this operation, which will be controlled by a cartridge dust collector. Aluminum alloys, stainless steel and alloys of nickel and chromium are cut on this equipment. Most of the alloys contain Rule 1401 listed carcinogenic compounds. The applicant has provided maximum possible toxic metal content levels for this operation. A worst case scenario will be evaluated here, where all the maximum toxic metal contents will be assumed present in the metal and it is cut 24 hours every day of the year. Even though a considerable amount of emissions get deposited on the jig below, all the emissions will be calculated as emitted.

Maximum Metal Density	=	0.33 lb/cu. in.
Maximum Metal Thickness	=	0.25"
Maximum cut width	=	0.014"
Maximum Metal cut in one hour	=	480"
Control efficiency	=	99%
Toxic metal content:	=	30% Cr, 79.5% Ni, 4% Cu, 3% Mn, 0.35% Pb
PM10 emissions	=	50% PM emissions.

The emission factors for laser cutting system are similar to plasma arc metal cutting system. In both these systems metal is melted away under high level energy. The District performed a source test to derive the emission factors for Hexavalent Chromium during the evaluation of the plasma arc cutting system under application no. 184446. It should be noted here that trivalent chromium in the alloy metal converts to hexavalent chromium at a high temperature. Also, some of the molten metal re-solidifies on the cut edges.

Particulate Emission Factor* for plasma/Laser arc cutting	0.12 lb/lb Cut
Hex. Chromium emission factor* for plasma arc cutting	0.00022 lb hex. Cr/total Cr in metal cut

* Source test data, Appendix B, 4-24-90, P/C report, A/N 184446

PM/PM10 Emissions:

Assumed: 480" cut is made on a 0.25" thick metal plate in one hour.

Total volume of the metal removed by the cut = 0.25" deep X 0.014" wide X 480" long
= 1.68 cu. in/hr

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT ENGINEERING AND COMPLIANCE DIVISION <i>Large Coating, Printing and Chemical Operations Team</i> APPLICATION PROCESSING AND CALCULATIONS	PAGE 5 of 9 APP. NUMBERS 497492, 512705, 512708 PROCESSED BY SMP REVIEWED BY DATE 08/07/10
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------

Total weight of the metal removed by the cut = $1.68 \times 0.33 \text{ lbs/1 cu. in.} = 0.56 \text{ lbs/hr.}$

Total weight of PM emissions (R1) = $0.56 \times 0.12 \text{ lb/lb} = 0.067 \text{ lbs/hr PM}$

Total weight of PM/hr (R2) = $0.067 \text{ lbs/hr} \times 0.01 = 0.00067 \text{ PM lbs/hr}$

Total weight of PM10 emissions (R1) = $0.067 \times 0.5 \text{ lb/lb} = 0.034 \text{ lbs/hr PM10}$

Total weight of PM10/hr (R2) = $0.00067 \text{ lbs/hr} \times 0.5 = 0.00034 \text{ PM10 lbs/hr}$

Hexavalent Chromium Emissions

Total weight of PM per hour (R2) = 0.00067 lbs/hr

Total weight of Chromium in PM emissions (R2) = $0.00067 \times 0.3 = 0.0002 \text{ lbs/hr}$

Total weight of Hex. Cr emissions (R2) = $0.0002 \times 0.00022 = 0.000000044 \text{ lbs/hr}$

Annual Hex. Chrome Emissions = $0.000000044 \times 24 \times 365 = 0.000385 \text{ lbs/year}$

Nickel (Ni) Emissions

Total weight of PM per hour (R2) = 0.00067 lbs/hr

Total weight of Nickel in PM emissions (R2) = $0.00067 \times 0.795 = 0.0005 \text{ lbs/hr}$

Annual Nickel Emissions = $0.0005 \times 24 \times 365 = 4.38 \text{ lbs/year}$

Copper (Cu) Emissions

Total weight of PM per hour (R2) = 0.00067 lbs/hr

Total weight of Copper in PM emissions (R2) = $0.00067 \times 0.04 = 0.00003 \text{ lbs/hr}$

Annual Copper Emissions = $0.00003 \times 24 \times 365 = 0.2628 \text{ lbs/year}$

Manganese (Mn) Emissions

Total weight of PM per hour (R2) = 0.00067 lbs/hr

Total weight of Copper in PM emissions (R2) = $0.00067 \times 0.03 = 0.00002 \text{ lbs/hr}$

Annual Copper Emissions = $0.00002 \times 24 \times 365 = 0.18 \text{ lbs/year}$

Lead (Pb) Emissions

Total weight of PM per hour (R2) = 0.00067 lbs/hr

Total weight of Lead in PM emissions (R2) = $0.00067 \times 0.0035 = 0.0000023 \text{ lbs/hr}$

Annual Pb Emissions = $0.0000023 \times 24 \times 365 = 0.02 \text{ lbs/year}$

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT ENGINEERING AND COMPLIANCE DIVISION <i>Large Coating, Printing and Chemical Operations Team</i> APPLICATION PROCESSING AND CALCULATIONS	PAGE 6 of 9 APP. NUMBERS 497492, 512705, 512708 PROCESSED BY SMP REVIEWED BY DATE 08/07/10
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------

Toxic Compound Emissions and Risk Assessment

A Tier 2 Risk Assessment was performed to determine the health risk from the toxic air contaminants emitted from a dust collector. The assessment calculated a cancer risk of 0.529 in a million (5.29E-07) for the residential receptor and 0.103 in a million (1.03E-07) for a commercial receptor. The assessment also calculated both acute and chronic hazard index risks and all the risks were below 1. Thus, the Tier 2 risk assessment demonstrated compliance with the Rule 1401 requirements.

Application No. 512708 (Dust Collector)

Filter Area Ft ²	: 9120 Ft ²
Filter Cleaning method	: Reverse Pulse Jet
Dust Collector Efficiency	: 99% (per manufacturer)
Exhaust Blower capacity	: 12750 cfm
Dust collected	: closed 55 gallon drum

Controlled PM emissions (R2) = 0.0005

Exhaust Air Particulate Emission Concentration (PC)

= R2 / Blower CFM x 7,000 grain/lb / 60 min/hr
= 0.0005 / 12750 CFM x 7000 / 60 = 0.000005 grain/cfm

Air-to-cloth ratio (A/C)

A/C = Blower CFM / Filter Area = 12750/9120 = 1.39 : 1

RULES/REGULATIONS EVALUATION

☉RULE 212, PUBLIC NOTIFICATION

❖SECTION 212(c)(1):

This section requires a public notice for all new or modified permit units that may emit air contaminants located within 1,000 feet from the outer boundary of a school. This source is not located within 1,000 feet from the outer boundary of a school. Therefore, public notice will not be required by this section.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT ENGINEERING AND COMPLIANCE DIVISION <i>Large Coating, Printing and Chemical Operations Team</i> APPLICATION PROCESSING AND CALCULATIONS	PAGE 7 of 9 APP. NUMBERS 497492, 512705, 512708 PROCESSED BY SMP REVIEWED BY DATE 08/07/10
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------

❖ **SECTION 212(c)(2):**

This section requires a public notice for all new or modified facilities which have on-site emission increases exceeding any of the daily maximums as specified by Rule 212 (g). As shown in the following table, the emission increases are below the daily maximum limits specified by Rule 212(g). Therefore, public notice will not be required by this section.

LB/DAY	CO	NOX	PM ₁₀	ROG	SOX	Lead
MAX. LIMIT	220	40	30	30	60	3
INCREASES	0	0	0.01	0	0	0

❖ **SECTION 212(c)(3):**

The Tier 2 assessment indicated a cancer risk of 0.529 in a million for the residential receptor and 0.103 in a million for a commercial receptor due to toxic emissions from the metal cutting. Therefore, public notice will not be required by this section.

❖ **SECTION 212(g):**

This section requires a public notice for all new or modified sources which have on-site emission increases exceeding any of the daily maximums as specified by Rule 212 (g). As shown in the following table, the emission increases are below the daily maximum limits specified by Rule 212(g). Therefore, public notice will not be required by this section.

LB/DAY	CO	NOX	PM ₁₀	ROG	SOX	Lead
MAX. LIMIT	220	40	30	30	60	3
INCREASES	0	0	0.01	0	0	0

▣ **RULES 401 & 402, VISIBLE EMISSIONS & NUISANCE**

Compliance with these rules is expected with the proper operation of the equipment. The field evaluation of this equipment was performed and the observation of the operation indicated compliance.

REGULATION XIII

▣ **RULE 1303(a), BEST AVAILABLE CONTROL TECHNOLOGY (BACT)**

(a) PM₁₀ EMISSIONS

Use of high efficiency cartridge filter unit will satisfy BACT requirements.

▣ **RULE 1303(b)(1), MODELING**

No detailed modeling analysis required for <0.41 PM₁₀ emissions.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT ENGINEERING AND COMPLIANCE DIVISION <i>Large Coating, Printing and Chemical Operations Team</i> APPLICATION PROCESSING AND CALCULATIONS	PAGE 8 of 9 APP. NUMBERS 497492, 512705, 512708 PROCESSED BY SMP REVIEWED BY DATE 08/07/10
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------

▣ **RULE 1303 (b)(2), EMISSION OFFSETS**

The PM10 emissions from this equipment are <0.5 lb/day. Thus, emission offsets are not required.

▣ **RULE 1401, NEW SOURCE REVIEW OF CARCINOGENIC AIR CONTAMINANTS**

As discussed in this evaluation report, this equipment is expected to comply with the rule requirements. (MICR from the laser cutting operation is expected to be less than 1×10^{-6} and HIA & HIC to be below 1.)

REG XXX

This facility is in the RECLAIM program. The proposed project is considered as a “de minimis significant permit revision” for non-RECLAIM pollutants or hazardous air pollutants (HAPs), and a “minor permit revision” for RECLAIM pollutants to the RECLAIM/Title V permit for this facility.

Non-RECLAIM Pollutants or HAPs

Rule 3000(b)(6) defines a “de minimis significant permit revision” as any Title V permit revision where the cumulative emission increases of non-RECLAIM pollutants or HAPs from these permit revisions during the term of the permit are not greater than any of the following emission threshold levels:

<u>Air Contaminant</u>	<u>Daily Maximum (lbs/day)</u>
HAP	30
VOC	30
NO _x *	40
PM ₁₀	30
SO _x *	60
CO	220

* Not applicable if this is a RECLAIM pollutant

To determine if a project is considered as a “de minimis significant permit revision” for non-RECLAIM pollutants or HAPs, emission increases for non-RECLAIM pollutants or HAPs resulting from all permit revisions that are made after the issuance of the initial Title V permit shall be accumulated and compared to the above threshold levels. This proposed project is the 1st permit revision to the Title V renewal permit issued to this facility on March 25, 2010. The

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT ENGINEERING AND COMPLIANCE DIVISION <i>Large Coating, Printing and Chemical Operations Team</i> APPLICATION PROCESSING AND CALCULATIONS	PAGE 9 of 9 APP. NUMBERS 497492, 512705, 512708 PROCESSED BY SMP REVIEWED BY DATE 08/07/10
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------

following table summarizes the cumulative emission increases resulting from all permit revisions since the initial Title V permit was issued:

<i>Revision</i>	<i>HAP</i>	<i>VOC</i>	<i>NOx</i>	<i>PM₁₀</i>	<i>SOx</i>	<i>CO</i>
1st Revision: Add new laser cutter and dust collector, A/N 497492 and 512708.	0	0	0	0	0	0
Total	0	0	0	0	0	0
Maximum Daily Limit	30	30	40	30	60	220

* RECLAIM pollutant, not subject to emission accumulation requirements

Since the cumulative emission increases resulting from all permit revisions are not greater than any of the emission threshold levels, this proposed project is considered as a “de minimis significant permit revision” for non-RECLAIM pollutants or HAPs.

RECLAIM Pollutants

Rule 3000(b)(12)(A)(v) defines a “minor permit revision” as any Title V permit revision that does not result in an emission increase of RECLAIM pollutants over the facility starting Allocation plus nontradeable Allocations, or higher Allocation amount which has previously undergone a significant permit revision process.

Since NO_x is a RECLAIM pollutant for this facility, a separate analysis shall be made to determine if the proposed permit revision is considered a “minor permit revision” for RECLAIM pollutants. The proposed project is expected to result in no increase in NO_x emissions from this permit revision. As a result, this proposed project is considered as a “minor permit revision” for RECLAIM pollutants.

RECOMMENDATION

The proposed project is expected to comply with all applicable District Rules and Regulations. Since the proposed project is considered as a “de minimis significant permit revision” for non-RECLAIM pollutants or hazardous air pollutants (HAPs), and a “minor permit revision” for RECLAIM pollutants, it is exempt from the public participation requirements under Rule 3006(b). A proposed permit incorporating this permit revision will be submitted to EPA for a 45-day review pursuant to Rule 3003(j). If EPA does not have any objections within the review period, a revised Title V/RECLAIM permit will be issued to this facility.